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The Protean Environmental State in Dongguan: Reconceptualising the local state and ecological development in China

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Abstract

How China copes with the deep-rooted challenges of improving its environmental quality raises questions about how economic and environmental tensions arise, whether they can be reconciled, and if so, how that might be achieved. In this paper, we critically examine evolving environmental governance challenges at the city level since it is here that much public policy delivery takes place. In major urban areas problems of poor waste management, and air and water pollution have been experienced by citizens for some time. What is novel is that municipal governments now have some capacity to act to improve local environmental conditions. Moreover, municipal governments are being assisted, to some extent, in their rethinking of environment-economy relations by a central government policy agenda that is moving from an overwhelming preoccupation with development to taking on board welfare and environmental concerns. This is demanding a reconceptualisation of the local state from being one that is almost wholly development oriented to one that recognises environmental imperatives. The paper outlines key perspectives on the local state, particularly the ideas of a developmental, entrepreneurial and green state. It draws on these accounts to produce a more nuanced analysis of the multi-faceted nature of environmental governance. We call this the Protean Environmental State. To put these debates into a local context we analyse how one early-industrialising city, Dongguan, is facing up to its polluted environment and seeking to steer its way towards a new, more ecologically friendly development pathway.

The Protean Environmental State in Dongguan: Reconceptualising the local state and ecological development in China

1. Introduction

The pace and scale of Chinese urban development is a consequence of the Open Door and Reform Policy adopted by the government since the late 1970s. This has stimulated industrialisation and economic growth in urban areas and created a demand for labour that has often been met by rural areas whose population has declined. Urbanisation and industrialisation have spawned a range of environmental problems (Liu and Diamond 2005), including air pollution (Matus et al 2012), water pollution (Liu and Yang 2012; Zhao et al 2013), soil degradation (Lu et al 2015) and waste (Tian et al 2013). How China copes with these environmental challenges is a contentious issue since it raises questions of the current dominant development model, the capacity of the Chinese state at the local and national level to regulate for improved environmental conditions, and of the environmental quality that citizens aspire towards.

To tackle the negative consequences of development, the Chinese government has formulated policies that, for example, define carbon emission targets for each provincial and municipal government, encourage low carbon development, promote energy efficiency and provide financial support for environmental protection projects. Key initiatives include the adoption of the idea of Ecological Civilisation by the 17th National Congress of the Central Committee of the Communist Party of China and its reaffirmation by the subsequent 18th National Congress. Ecological Civilisation is not only about protecting the environment, but also promoting a socially harmonious society. While there are wide-ranging discussions on the meaning of Ecological Civilisation and a new type of urbanisation (Yu 2016), there is agreement that the objectives of Ecological Civilisation are to seek practical solutions to deliver ecological transformation. In practice, this means the Chinese government continues to promote economic development while, at the same time, aiming to

protect the environment. It is a development strategy that is aligned with weaker forms of ecological modernisation (see below). Further emphasis has been given to the development of an alternative model of urban development with the publication of National New-type of Urbanization Plan (2014-2020) (Chinese Government 2014). This consists of policies to promote liveability, social sustainability, and energy efficiency. The Plan encourages economic development to increase people's living quality but recognises the negative environmental and welfare consequences that arise from untrammelled economic development. Other related laws and regulations have also been adopted. For example, a revised Environmental Planning Act 2014 came into force on January 1st, 2015. This provides for stricter environmental protection (NPC, 2014a), and is widely recognised to be the strictest environmental act in China's history. According to Zhang Mingqi, Deputy Director of the Law Committee of the National Peoples' Congress Standing Committee, the Act requires all tiers of governments to publicise environmental information and facilitate the participation of citizens and institutions in environmental protection (NPC, 2014b). Environmental protection thus becomes a social as well as a government responsibility.

While at the more abstract levels of national policy formulation, the tensions between development and environmental protection have become more muted, for local states they remain very real. Conflicts between environmental and developmental imperatives can break out on multiple fronts, for example, over the nature of regulation, the protection of environmental assets, or whether to support existing industries or encourage investments in new, cleaner firms. Alternatively, though, the local state can seek to resolve contradictions in development as new coalitions rethink relationships between the environment and development and chart novel growth strategies. To better understand how local states respond to, resist or seek to shape environmental and developmental agendas, we need to reconceptualise the local state so that we move from more simplistic binary notions (Li et al 2011). In rethinking the local state, we draw attention to local development patterns and possibilities to show how they interact with an environmental agenda to

produce a more complex, multi-faceted approach to local state activities. We call this the Protean Environmental State and apply it to the city of Dongguan.

The paper is organised as follows. In Section 2 below, we review key perspectives on the local state, particularly the ideas of a developmental and green state. We identify the weaknesses in dominant conceptualisations of the local state and argue for an approach that can encompass the breadth of environmental activities they undertake, along with an understanding of their development history. We term this more flexible and multi-faceted concept the Protean Environmental State. In Section 3, we analyse how one early industrialising city, Dongguan, is facing up to its polluted environment and seeking to steer towards a more ecologically friendly development pathway. Here we take forward our more nuanced perspective on the local environmental state and distinguish between its traditional role as a regulator with other features including environmental recovery through restoration projects and enhancement via more resource efficient industries. These three features (or emphases) of a local Protean Environmental State draw upon a national policy agenda and a distinctive local political and economic context. This local political context is shaped by an entrepreneurial political leader and a model of economic activity that owes much to the developmental state. Throughout the text, but especially in this section, we seek to draw out the ongoing tensions between continuing to prioritise economic growth whilst seeking to protect the environment. Finally, in Section 4, we reflect upon the contribution of the insights provided by our Protean Environmental State approach to the analysis of environmental governance.

1.1 Data collection methods

Our investigations into local state activity have relied upon two approaches to data collection. First, since 2014 we have been involved in social and economic transition research in Dongguan, a manufacturing city in southeast China. Our work in Dongguan is reported in Section 3 and has involved key person interviews with government officials involved with land development, especially

in the environmentally sensitive and economically important Waterside Area. Our key person interviews have rarely been one-to-one as senior figures have been accompanied by other officials. This has resulted in a more formal and less open form of data collection. For example, during some interviews officials read from prepared statements. In total we interviewed about 40 senior figures and their accompanying officials. In addition, we have had about 25 informal conversations with government officials during guided site visits. The nature of the conversations meant that it was not possible to record them or make contemporaneous notes. However, we did compile our recollections at the end of such sessions and use them to inform our understanding of development in Dongguan. We have also examined publicly available documents, newspaper reports and discussed our work with citizens. The data collection in Dongguan is contextualised with material that has been collected over several years and from a variety of sources. These include key person interviews with officials working in municipal governments, professional organisations (e.g. China Academy for Urban Planning and Design (CAUPD) and China Society for Urban Studies (CSUS)), site visits to ecological developments and regeneration projects, and questionnaire surveys.

Second, we have also made extensive use of key national, Provincial and City level government policy statements. This is because we are interested in the ways in which government perceives public policy challenges and how its thinking will shape practices and expectations at the local level (Li and Wu 2012). Drawing upon policy and official documents enables us to identify those areas where government seeks to speak with a unified voice (e.g. promoting Ecological Civilisation) and those occasions where sectoral or interest-based actors, that typify the silo-based approach to policy making, are to the fore (e.g. tackling environmental degradation).

2. Perspectives on the local state

The persistence of state authoritarianism, party-state governance and pro-growth pragmatism are central to interpreting current developments in China, and especially how it is linked to economic growth agendas (Cartier, 2015; Knight 2014). Equally important is to understand how local states

may seek to resolve or displace the tension between their economic development strategies and environmental protection. In this section, we provide a brief critique of the ways in which the developmental state, the entrepreneurial state and ecological modernisation seek to interpret contemporary environmental issues and how they may play out at the local level. At the end of the section, we draw together the analysis to suggest a way forward to analyse the local environmental state that recognises its multi-faceted nature of governing.

Two major ways to conceptualise the role of the local state in economic development are that of the developmental state and the entrepreneurial state. Although the developmental state is widely used to characterise rapid economic growth in East Asian countries such as Japan and South Korea, as Horesh and Lim (2017) point out there is a distinct Chinese variation that reflects the country's socially uneven development and the role of state-owned enterprises. A key approach to the developmental state is provided by Blecher and Shue (1996 and 2001) who analyse how a local state (county level government) plays direct and indirect roles to "plan, finance, and implement developmental projects" (Blecher, 1991: 268). The role of the local state is to support the activities of companies as best it can, including identifying those companies or sectors which are most likely to be successful. In a variant of the model, the entrepreneurial state is proposed by Jean Oi (1992) and Andrew Walder (1995). Both Oi and Walder understand a local state as acting like an entrepreneur. For instance, local state leaders perform the role of a board of directors in a company to make profits from Township Village Enterprises (TVEs) and sell land to maximise extra revenue for local government expenses and retain tax earnings (Lin, 2009; Oi, 1992 and 1999). For Oi (1992: 100-1), "local government coordinates economic enterprises in its territories as if it were a diversified business corporation." In contrast to the developmental state model, which locates entrepreneurialism in the local business community, here it is to be equally found in the local state because local officials will wish to expand revenue-generating activities (Oi 1992: 113), especially the "extraction of profits from enterprises" (Oi 1992: 118). To promote successful local enterprises local governments can exercise control over factory management, offer privileged access to resources

(e.g. raw materials, energy), provide investment and credit and make available bureaucratic services (e.g. prizes) (Oi 1992: 118-22). In the process, a significant outcome is the partnership between local businesses and governments due to their common interest in economic growth (Yu and Zhu, 2009); the local state innovates to provide support mechanisms to enable firms to flourish.

The principles of the local developmental state and the entrepreneurial state fit well the development context of Chinese reform and Open Door policies, which started off a process of transition from a centrally planned economy to a market economy. Rapid economic growth in China during the last four decades has owed much to powers being decentralised to local governments who have been very flexible to cope with rapid changes in the market. Both the developmental state and entrepreneurial state models are helpful in explaining why local states, with their variable economic opportunities will adopt different local economic development strategies. It is less clear, though, how these models may cope with more recent economic restructuring arising from financial crises and rethinking of the nature of environmental governance.

While state objectives and institutional arrangements can be modified to promote a revised developmental state (Knight 2014, Zhang 2018), it is by no means straightforward. It is not apparent how the developmental state thesis helps in understanding the ways in which local states may seek to develop alternative models which, at least to some extent, seek to incorporate economic and environmental imperatives. Meanwhile, conditions in which growth slows dramatically may not make it so straightforward to support leading companies or sectors. It is therefore rather problematic to show that the model of the entrepreneurial state or that of the developmental state can be reconfigured so that it seeks to resolve rather than exacerbate current public policy and citizen concerns.

To overcome some of these challenges on how to conceptualise the local state, there has been a fruitful rethinking of work on entrepreneurial governance. Harvey's (1989) argument that urban development in the West is increasingly characterised by state supported entrepreneurial activities,

such as backing for small firms, infrastructure investment and loans, has struck a resonant chord for work on China (Xue and Wu 2015), including shifts towards more ecologically informed development (Pow and Neo 2013; Pow and Neo 2015; Xu 2017). Pow and Neo (2013) argue that state-business coalitions are 'imaganeering' eco-forms of development as ways of promoting urban development and renewal. They point out a more entrepreneurial approach from government actors fits well with officials who are sympathetic to pro-growth thinking and the potential advantages of local economic development for their career advancement. As a result, development is only partially environmentally led. Priority is given to the visible, with a focus on remade city landscapes that are clean and green (Pow and Neo 2015: 2264). Xu (2017) similarly points to the tensions between entrepreneurial governance and eco-development but believes that these can be reconciled. Following the work of While et al (2004), Xu argues that there needs to be a better understanding of how state power plays out in different national and city contexts, because in some cases environmental issues are not simply a response to a national agenda but rather integral to a revised local development perspective. Development can therefore be simultaneously "both environmental and entrepreneurial" (Xu 2017: 703).

In its revised form the entrepreneurial state perspective clarifies why large-scale eco-developments may take place in major cities, and how state and business interests can coordinate their efforts to reimagine the urban form. What the perspective tends to do, though, is overemphasise 'big' projects and initiatives linked to city rebuilding/rebranding and underemphasise activities such as environmental regulation that are integral to the environmental state. Part of the reason why both the developmental state and entrepreneurial state models fail to sufficiently incorporate the potentially widespread and deep-rooted significance of environmental imperatives is because they overemphasise state-driven transformation processes, which results in an unduly static understanding of state-market relations and state-environment relations.

An alternative model, and one which emphasises the relationship between the market and the environment, as well as the breadth of government environment responsibilities, is that of the green state, promoted by those sympathetic to ecological modernisation. As Mol explains, “Ecological Modernisation indicates the possibility of overcoming the environmental crisis while making use of the institutions of modernity and without leaving the path of modernization” (Mol, 1995: 37). The core mechanism of ecological modernisation theory is “re-embedding” ecology into economic modernisation through “ecologising the economy” and “economising the ecology” (cf. Huber 1982 cited in Mol, 1995: 30). Ecological modernisation has become both a commentary on the way in which Western states integrate environmental issues into previously narrowly dominated economic arenas and a prescription for further reform, for example, in political institutions and regulatory frameworks. For the proponents of ecological modernisation, it is at heart an optimistic model of relations between the environment and development (Mol, 1995; 2006; York and Rosa, 2003).

Perhaps the most notable contribution to current understandings of ecological modernisation in China came from the report by the influential Chinese Academy of Sciences (CAS) in 2007 (CCMR 2007). The CAS report highlighted the role of technology in ecological modernisation thinking but gave less emphasis to reform of social institutions (e.g. decision-making processes). A less inclusive approach to decision making, along with the country's top-down delivery mechanism may mean that ecological reforms to protect the environment and stimulate green economic development can be more quickly and widely diffused than in more democratic societies.

There have, though, been several pertinent criticisms of ecological modernisation. Christoff (1996), for example, in comments directed towards western advocates of ecological modernisation, but which are equally relevant to the Chinese case, pointed out that it provides a technocratic solution to environmental problems, and unless strengthened would fail to recognise the more deep-rooted conflicts in institutions that undermine ecological progress. Subsequently, more attention has been paid to how the state, market and society interact (Buttel 2000), and to exploring the different ways

in which ecological modernisation may take root in different societies. Here the work of Mol and his colleagues has been particularly influential (see Carter and Mol 2007; Mol, 2006; Phung 2002; Zhang 2002). There is a growing recognition at both national and local levels that ideas of ecological modernisation are informing policy development and practice in China (e.g. CCMR 2007, Zhang et al 2007, Mol 2006) and need to be taken into account in explanations of contemporary policy development and delivery.

To summarise the argument so far: advocates of ecological modernisation overemphasize shifts in policy and pay insufficient attention to the complex nature of local state activity. As a result, there is the potential for ecological modernisation theory to fail to sufficiently appreciate how environmental issues play out in practice. The development and entrepreneurial state perspectives emphasise the historical roots of development but pay insufficient account to the emergence of a wider environmental agenda and how that may reshape our understanding of the contemporary local state. In analysing the local state and how it is transforming we need to give serious attention to both its operation and its institutionalisation of environmental issues. To do otherwise will lead to a partial analysis that risks underplaying or exaggerating the environmental agenda at the local level. We also need to recognise the breadth of local environmental activities. These include regulation, the recovery of damaged environmental assets and enhancing the local environment (e.g. regeneration to 'clean-up' a city, recreating an urban imagery, or the promotion of low carbon firms). Finally, attention must be given to the distinctiveness of local development trajectories, and of who has the "power to organise space" (Harvey 1989: 6). As we show below, governance, development and the environment are increasingly being connected in complex and contested ways. Our starting point for a revised model of the environmental state is, like that of Li et al (2011: 116) to recognise that the binary perspective of economic development versus environmental protection is inadequate. Second, we focus on place, so drawing attention to the nature and impacts of more localised development initiatives (Harvey 1989). Urban entrepreneurialism helps to reimagine

places. For our case study city of Dongguan this means reconstructing an image of a place that is the 'factory of the world' and a haven for polluting companies to one in which it can transition to the promotion of culture and tourism and is home to high-tech industry. Third, as both the developmental and entrepreneurial state perspectives suggest, an understanding of place must be rooted in an appreciation of the local development context since this both enables and constrains economic and environmental possibilities. Fourth, is the recognition of the role that individuals may play in shaping the nature of development (Harvey 1989: 7). This can be highly important in the Chinese context where city or provincial leaders can knit together a wide-ranging state apparatus to direct and deliver change. In addition, the links between state and market actors are much closer than those of liberal market economies providing a further mechanism to steer change.

Finally, and significantly, the complex nature of environmental problems allied to the breadth of state interventions enables the emergence of a multi-faceted local environmental state. One longstanding state activity is the regulation of pollution by companies. There are, though, a set of other local state activities that are part of environmental governance. These include state-led initiatives to recover the environment by improving degraded spaces. This might be cleaning up waterways or tackling spoilt landscapes. In addition, the state can act to enhance the environment by seeking to replace 'dirty' industries with cleaner ones. Another area of local state environmental activity is in relation to resource management (such as forests). Importantly, the nature of the environmental state is connected to development opportunities and environmental challenges. In Dongguan, polluted rivers could be cleaned up to enable more upmarket riverside property developments to take place. For both regulatory and land development activities, the state is to the fore. Similarly, the regulation of polluting industries became much more rigorous because it supported government policy to transform the industrial base to one founded on lower carbon use.

We have termed these different facets – regulatory, recovery and enhancement – the Protean Environmental State. This term reflects the multi-faceted, multi-dimensional nature of state

environmental activity and how it is in a constant state of flux. At any point in time, the Protean Environmental State can present one or more feature to different audiences. Moreover, these are not hard-edged features but blur into one another. By conceptualising the state in this more flexible way, we can begin to better understand how particular spaces are governed (e.g. in a regulatory or a recovery manner or a mix). It also helps to appreciate which of the different facets of the environmental state might be to the fore (or marginalised) and why. We can also examine how different facets of the Protean Environmental State complement or are in tension with one another (for example, efforts to recover polluted waterways might be undermined if the regulation of waterside firms is lax) (see also Walker 1989: 32). Dongguan makes a particularly good case study to analyse innovations in environmental governance because it typifies development challenges faced by early industrialising cities, while also bringing together economic and environmental reform strategies.

3. Shaping the environmental state in Dongguan

In this section, we outline how national policy to promote more environmentally informed development interacted with a local economic development strategy promoted by the Provincial Party General Secretary, Wang Yang, to shape the local environmental state in Dongguan. In closing polluting firms and seeking to attract high-tech, low carbon companies, Wang Yang sought to utilise national symbols of economic development to justify his strategy (Lim 2016) but was also able to legitimise his approach because of the emerging national environmental agenda. This too supported economic restructuring (see also Li et al 2011). As we argue, national environmental policy, economic reform and the practices of the developmental state have done much to form the contemporary environmental state in Dongguan.

3.1 Local politics and national strategies

Dongguan is part of a nationally important economic area, the Pearl River Delta. It is in Guangdong Province and has two other major cities nearby, Shenzhen and Guangzhou. It was one of the earliest cities to take advantage of China's Open Door policy and quickly grew into an industrial centre, benefitting from its proximity to Hong Kong and local political elites who were willing to attract FDI to further boost the local economy (Shan and Tsai 2016: 116-7). Like many manufacturing cities, the processes of industrialisation and urbanisation in Dongguan followed a bottom up path in which rural areas become urban areas, and a rural population migrates to the city. The Municipal Government, town governments, villages, and even local residential (village) groups in Dongguan gave priority to attracting inward investment. Supporting business and enterprise development was treated as local governments' dominant economic policy (Wang and Zhu, 2013, Belcher and Shue 1986 and 2001). Much of the economic activity in Dongguan was processing and assembly that relied upon vast numbers of migrant workers. Products were then exported, generating enormous revenues and confirming the city's reputation as a 'workshop of the world'.

Many inward investment projects, typically those from Hong Kong and Taiwan drew upon shared cultural connections. Investors entered directly into cooperation with villages. The local villages used or established new township enterprises as a partner to work with investors (Yin and Jiang, 2003; Rolf 2019, Oi 1992 and Walder 1995). It is difficult to exaggerate the scale and rapidity of change. Out of a total of 581 villages in Dongguan 512 established their own factories and/or joint venture enterprises (Yin and Jiang, 2003). Township and village governments participated directly in economic development by attracting and supporting investment with the appointment of staff to support companies (Shan and Tsai 2016). For example, Wusha Village in Dongguan, with a local Hukou population of 3483, attracted and set up 265 enterprises which employed more than 70,000

migrant workers (Yin and Jiang, 2003). The township enterprise development model of Dongguan enriched towns and increased their economic influence and their political capability.

However, promoting Township Village Enterprises had implications for future environmental regulation and pollution. For instance, when seeking to attract firms the land used for township enterprises might not have formally been changed to state ownership. This had a benefit for local development as it reduced land costs and bureaucracy in changing land use so smoothing the way for investors. However, by taking the land out of the spatial planning system and the enterprise out of Municipal Government's policy and regulatory sphere it subsequently became problematic to apply planning and pollution regulation controls (discussions with officials in local planning department January 2014).

By the late 1990s and into the early 2000s, senior local officials began to recognise that the city was facing greater national and international competition. Efforts were made to improve infrastructure, attract higher technology firms and to consolidate economic activity on better serviced specialist industrial estates (Shan and Tsai 2016). Further impetus was given to the local programme of economic reform with the appointment of Wang Yang as Party Secretary for the Province of Guangdong in late 2007 (Lim 2016; see also Harvey 1989 who points to role of entrepreneurial figures in development). In his analysis of economic restructuring in Guangdong, Lim (2016) shows how Yang was able to connect national economic policy with local reform to legitimise change. Shifting national level environmental policy commitments (see above), could also be utilised to justify promoting more resource efficient firms and discouraging polluting companies. In this way, economic and environmental agendas could be mutually supportive of a programme of economic modernisation (Lim 2016, p415 and endnote 3 p431-2; Shen et al 2017; see also below). During a visit to Dongguan, Wang Yang called upon the municipal government to push through industrial restructuring (Lim 2016: 422) and argued that officials "must fully develop ... [their] impact by devising and implementing policies for industrial reconfiguration, transformation and upgrading"

(quoted in Lim 2016: 422). With many firms in Dongguan downscaling or closing because of the global financial crisis, there were also reports of officials driving away polluting industries (Shen et al 2017).

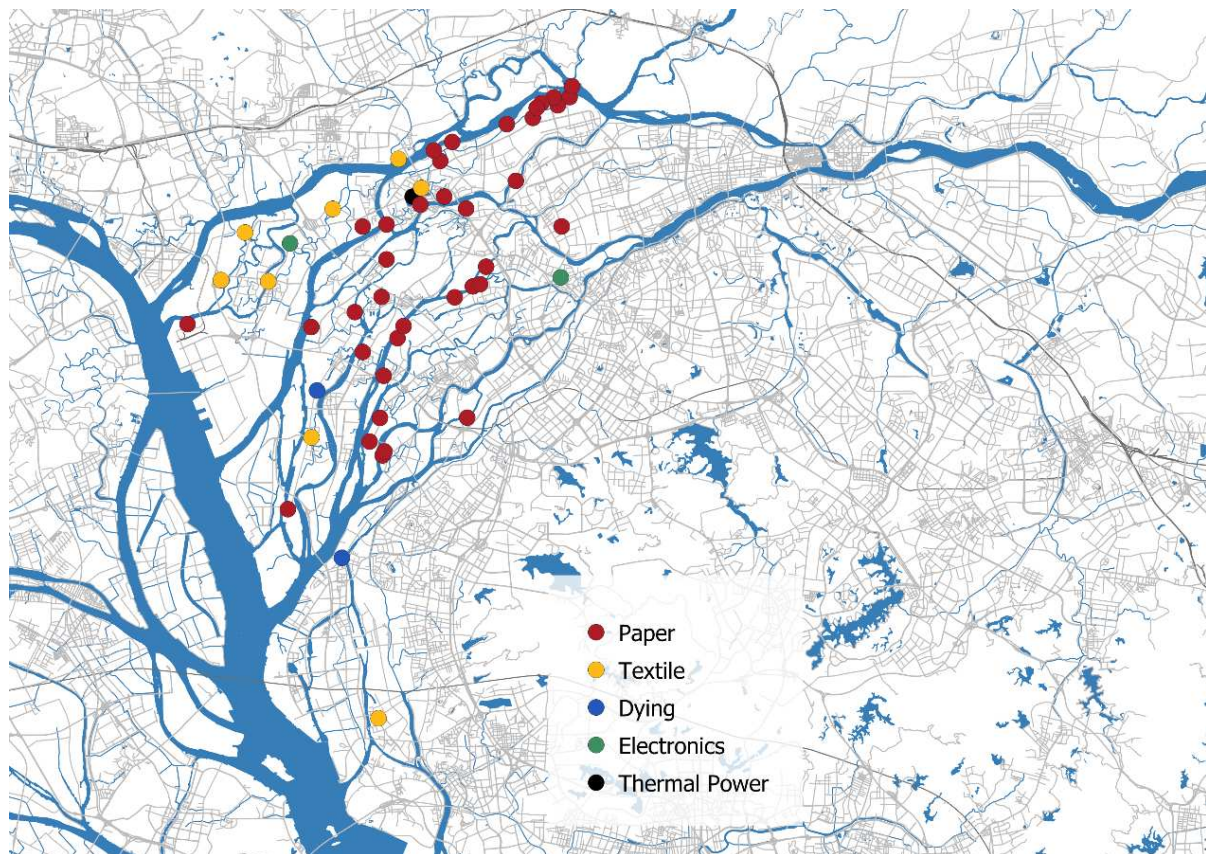
The complex ways in which economic and environmental imperatives interact at the local level requires analysis that moves beyond approaches that rely upon the developmental state, entrepreneurial state or green state. There needs to be a reconceptualisation of the local state that can capture the multi-faceted nature of environmental governance. Drawing upon our empirical material, we now present our interpretation of how the Protean Environmental State is increasingly present and performing multiple roles in Dongguan.

3.2 Economic imperatives, environmental conditions and the reshaping of the environmental state

Promoting a township model of development has been at great cost to the environment. Working to the policy of “development is the absolutely priority” town governments and village leaders in Dongguan and elsewhere failed to recognise the devastating consequences of pollution for human health or the environment, and when they did begin to recognise problems failed to act sufficiently quickly or robustly. The long shadow cast by prioritising development stifled efforts at environmental reform or even the implementation of regulations. Typically, environmental standards were regarded as a potential economic cost and curb on growth (interviews with senior officials of the Dongguan Environmental Protection Bureau January 2014). Interviewees emphasised the significance of Dongguan’s Waterside Area, made up of multiple rivers, that makes for a very sensitive environment. Data produced by the Dongguan Environmental Protection Bureau (2014) shows that more than 13 different sectors with more than 650 factories generated severe pollution to rivers in 2013. These polluting factories were in areas of high population density (Figure 1) and can be matched to the location of wastewater discharging points (Figure 2). Due to the direct discharging of untreated effluent into rivers the overall water quality is poor. Ground water in China is divided into five different categories from Class I which is Excellent to Class V which is Severely

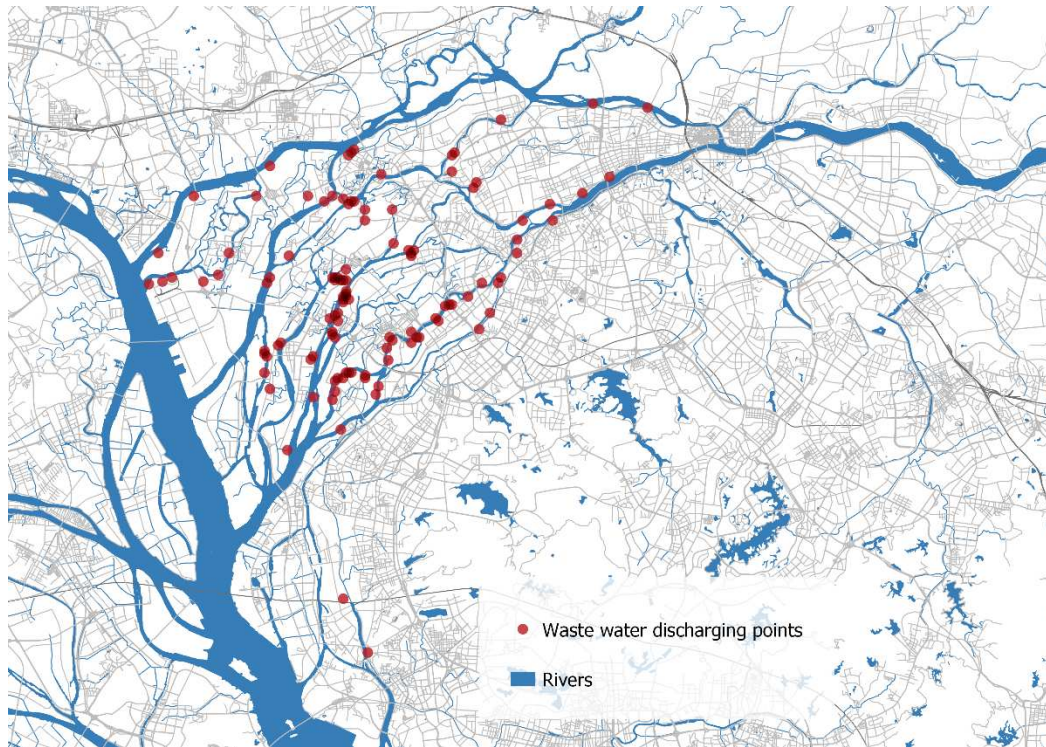
Polluted. When monitoring water quality between January and July 2013 in 10 rivers, the Environmental Protection Bureau found that 75% were in poor quality and of class IV, a finding that was reinforced by the monitoring of 18 sections of river in the following year (Dongguan Environmental Protection Bureau, 2014).

Figure 1: Location of key polluting factories in Dongguan



Source: Based on Guangdong Water Conservancy and Electric power (Survey and Design) Research Institute, 2014

Figure 2: Wastewater discharging points in Dongguan



Source: Based on Guangdong Water Conservancy and Electric power (Survey and Design) Research Institute, 2014

The features of the Protean Environmental State are fuzzy and constantly needing to be constructed to retain their legitimacy. Different audiences are presented with, and hear, different emphases. In Dongguan, regulation helps to reduce air and water pollution, so investments in air and water quality become more attractive (interviews with senior officials of the Dongguan Environmental Protection Bureau January 2014). The most prominent feature of the local Protean Environmental State is a *regulatory* one. Previously ignored rules were implemented and new, higher environmental standards adopted. More stringent enforcement proved to be controversial because it provided the most direct challenge to the previously dominant regulatory style and was directly linked to local factory closures, causing unease amongst local officials and opposition from migrant workers (interviews with officials from the Environmental Protection Bureau and discussions with community representatives January 2014). Objections to factory closures were overridden and in a

key statement of ambition, it was reported that: “Dongguan government will deliver the most stringent supervision, enforcement, severe punishment ... to prevent pollution. The policies are [to be] combined with reasonable financial incentives ... to close down and exit ... polluting enterprises” (Dongguan Government 2014). Investment in factory closure or relocations was considerable. In interviews with local senior officials in Dongguan we were informed that local government had invested more than 10 billion Yuan as compensation to close polluted enterprises, including paper mills, dying, electronics and textile companies. In one year alone, 2015, “101 enterprises with high pollution, high energy consumption ... but low productivity” were closed at a cost of 1.71 billion Yuan (Dongguan Government 2016).

In principle, the entrepreneurs of these closed enterprises should no longer operate the same factories in China. In practice, though, Dongguan officials told us that several factories had moved to the western part of China. Other factories had simply relocated to less developed cities in nearby Guangdong. These operations continue to pollute local waterways and to adversely affect water quality in Dongguan. Now, though, these companies are outside of the government's regulatory reach. Often factories that have relocated their polluting enterprises have received a double financial incentive - a payment from Dongguan Municipal Government to close their operations in the city boundaries and a relocation payment from the government in which they are now based - and often without needing to reduce their levels of pollution. The ongoing competition for investment amongst less developed areas of China means that development-oriented local states continue to privilege economic growth over environmental protection. Judgements about where to draw the line between the economy and the environment can be finely balanced and local context matters. For example, in Dongguan two large and high-profile paper mills remained in operation. Amongst officials these two companies are regarded as too important to the local economy to seek their closure or relocation.

Once sustained regulatory efforts are made to halt ongoing environmental degradation, then other features of the Protean Environmental State appear, including *recovery*. Here the local state leads on efforts to overcome degradation to environmental assets, such as waterways. Seeking to recover environmental resources sits more comfortably with the operation of the developmental state in Dongguan because it is the state framing what counts as nature and what it should look like.

The Waterside Area was where most of the polluting activities were concentrated (see Figures 1 and 2 above) and where recovery activities were focussed. As a key government circular pointed out it is necessary

“to optimize the industrial structure, to help promote the Waterside Economy Area, to hasten the closure and exit of enterprises with high pollution, high energy consumption ... but low productive efficiency [the so-called “Two Highs and One Low”] in the area for Ecological Civilisation development, and to build a Water Ecological Civilisation demonstration area [that will be recognised] at national and provincial levels.” (Dongguan Government 2014)

The quote is revealing for several reasons. First, Dongguan Government recognised the local environmental state was multifaceted by bringing together the regulatory and recovery state. There is also a connection to the environmental enhancement activities that could take place since the demonstration area would seek to attract companies, though this has proved to be challenging (see below). Second, local activities are being legitimated through recourse to a key national environmental strategy, that of Ecological Civilisation. Third, there is an environmental spatial fix (Castree 2008a and b) in which recovery in the Waterside Area is linked to revised forms of economic activity as tourism can be promoted, and river boat trips are becoming increasingly popular (see Figure 3).

Environmental investments are socially and spatially variable. In 2015, there were investments in upgrading 400km of the wastewater network and 11 new or expanded sewage treatment works

were completed (Dongguan Government 2016). A senior figure in the Waterside Administrative Commission pointed out that such investments are important in seeking to recover a highly polluted water environment. Making river water cleaner was accompanied by extensive planting. The vibrant colours of water plants vividly represented the cleansing of rivers (see Figure 3). Riverside plants and enhanced access to riversides are largely for the enjoyment of local social and political elites and not migrants or local workers. Indeed, in some rivers, although water quality may have improved it remained polluted and continues to be used for traditional activities such as washing (see Figure 4). Despite the investments in sewage treatment for homes in Dongguan, as well as those upstream, there continues to be a discharge of sewage into waterways.



Figure 3 Local river tourism to view waterside plants

Source: the authors



Figure 4 Villagers washing household items

Source: the authors

Beautification of the environment is also for the benefit of external audiences. It provides visual evidence of the cleaning up of Dongguan. For local party officials' beautification utilises local economic resources which they are well used to mobilising (Rolf 2019). Beautification is also sympathetic to the short-time horizons that typify cadres' environmental actions (Eaton and Kostka 2014). More problematic, therefore, are efforts to promote the wider geographical recovery of the environment. Negotiations with neighbouring, upstream governments on improvements that they may make in water quality founder because of time and resource constraints.

A third feature of Dongguan's Protean Environmental State is *enhancement*. Here efforts are made to ratchet up the resource efficiency of local firms and to attract low carbon companies, including tourism ventures. It is clearly aligned to the economic restructuring agenda of Wang Yang. In ways that are typical of the developmental state in Dongguan, townships compete for investments and promote their own initiatives. Local governments determine where development takes place through their control of the planning system and then through their involvement with businesses can shape the timing and nature of development. Typically, local interests prevail with less concern for what they might mean for neighbouring areas or the city.

One popular development is the construction of waterside towns and villages (see Figure 5). Previously citizens would have shunned waterways, but these now become desirable locations. Construction of homes and the small-scale commercial enterprises that go with them (e.g. shops, restaurants, boat trips) help citizens to re-engage with water as an environmental asset. Building projects, like new planting schemes, are highly visible examples of government led environmental recovery and enhancement activities. Again, though, such initiatives highlight the piecemeal nature of environmental management as competition between towns and villages for investment prevails over efforts to govern at an ecosystem or watershed level.



Figure 5 Riverside development

Source: the authors

Dongguan's Government was committed to the 'Four Improvements': in urban quality, the environment, social governance and people's living quality (Dongguan Government 2016). Citizens gain from improved air quality and some traditional communities benefit from better water quality and sewerage infrastructure, but beyond that, for many local people and migrants' debates on environmental quality have little interest (discussions with community leaders). The environmental enhancement state can facilitate additional opportunities to access the environment, but this will be limited, for example, to those who live in a new waterside community, anglers, and those who participate in tourism activities such as river boat rides.

Finally, we need to consider the prospects for the Protean Environmental State in Dongguan and what it may have achieved. More rigorous environmental regulation was allied to economic

restructuring to legitimate reform activities. Is there an institutionalisation of environmental management? Is there an improvement in the environment? We can go some way to answering these questions by examining data on environmental quality and reviewing regulatory practices.

There is an irony in that although more environmental data is being collected by local officials, accessing it in a timely manner has become more problematic (Rhode and Miller 2015: 2).

Consequently, assessments of how environmental quality in Dongguan may have changed over time need to draw upon a variety of data sources. In terms of the Protean Environmental State we are interested in regulatory, recovery and enhancement information. We consider each of these in turn below.

The key regulatory issues in Dongguan have related to enforcement activities for air and water quality. According to a mayor in Jiangsu province, regulation typically follows a process of “inspection, rectification and punishment” (Reuters 2018), and this certainly holds for Dongguan. Dongguan government identified 136 major pollutant discharging sources from sectors such as clothing, paper making, thermal power that have been monitored and supervised on a regular basis. In addition, between 2016 and 2018, 31896 enterprises were punished for discharging pollutants. These included leather processing firms, plastic mould factories, hardware companies, power suppliers, wool and textile factories, handicrafts, paper mills, concrete producers, shoe factories, furniture companies, and electronics firms (Dongguan Municipal Bureau of Environmental Protection (2018a). Despite the evidence of regulatory activity, Dongguan has been caught up in renewed central government efforts to curb polluting activities and exhorted to take further efforts to sanction polluters (Reuters 2018).

Air quality in China has significantly improved in recent years (CAAC 2017). NASA data on air quality for Guangdong and its key cities, such as Dongguan, Shenzhen and Guangzhou show similar marked reductions in NO₂ between 2005-16 (see Table 1), though, air pollution, as measured by NO₂, remains worryingly high. In contrast, Tianjin a city with a long-standing record of pollution showed a

much more modest reduction in NO₂. An important reason why NO₂ fell across the province rather than simply for an individual city, such as Dongguan, was that Guangdong closed many smaller, and potentially inefficient, power stations than any other province (Stoerk 2017). So, any improvements in air quality are at least as much a reflection of a province-led initiative as something happening at city level.

Table 1 Change in Nitrogen Dioxide in selected cities

City	2016 Average NO ₂	2005-2016 change (%)
Dongguan	15.96	57.16
Shenzhen	14.54	51.70
Guangzhou	17.69	51.52
Tianjin	14.06	6.21

Source: NASA Air Quality Observations from space. <https://airquality.gsfc.nasa.gov/no2/world/east-asia/dongguan>

So, what of Dongguan specific environmental quality impacts? And what role might the environmental regulatory state play? In 2017, the ambient air quality index (AQI) in Dongguan ranged between 23 (rated as Excellent) and 206 (Heavily Polluted). One of the pollutants measured in the AQI is PM_{2.5} exposure because of its potentially severe effects on human health. The Chinese government sets a maximum standard for PM 2.5 exposure of 75 ug/m³ in a 24-hour average. In Dongguan in 2017, 301 days reached the standard, 18 days less than that of 2016 (Dongguan Municipal Bureau of Environmental Protection, 2018b). Progress in improving air quality in Dongguan is fitful. Moreover, as the data from NASA and the AQI information shows, city dwellers still experience poor quality air, in part because it blows in from polluting sources outside of the city.

A similar picture emerges of ongoing challenges in relation to improving water quality. In 2017, the quality of river water in Dongguan continued to slowly improve: 40% was recorded as Class III. Class

IV (meaning unfit for humans to touch) water covered 20%, and the other 40% was still at Class V water quality (Dongguan Municipal Bureau of Environmental Protection, 2018b). Liu et al (2018) suggest that improvements in water quality owe as much too economic restructuring as they do to state efforts to clean up polluted rivers. Again, as in the case of air pollution, Dongguan is receiving pollution from beyond its borders. The Dongjiang River flows through cities such as Heyan and Huizhou before it reaches Dongguan. Efforts to tackle cross-boundary water pollution via the Pearl River Water Resources Commission and the Department of Water Resources of Guangdong (Yang et al 2018) prove to be inadequate when faced with illegal discharges and inadequate infrastructure. For example, in 2016, officials in Dongguan released nearly 45,000 tonnes of raw sewage into local waterways (Caixin 2017).

Insights into both the recovery and the enhancement environmental states can be gained from a study of the comparative performance of green development in cities in the Pearl River Delta (Wang et al 2018). Wang et al (2018) develop indices using 2015 data for the living environment (covering such things as green space) and the treatment of pollution, which correspond reasonably well to the recovery state; and the extent to which economic growth is becoming more environmentally efficient (e.g. energy consumption per unit of GDP) and the extent of industrial transformation to a cleaner economy (e.g. added value of tertiary industry) which provide insights into the environmental enhancement state. Their results show that for cities in the Pearl River Delta, there are no consistent patterns to their performance. For environmental activities, cities such as Shenzhen and Guangzhou are more successful than Dongguan. Only in relation to the treatment of pollution does Dongguan perform well and that is only relative to other poor performers because, as we have seen above, its efforts are patchy.

The data on the changing quality of the environment in Dongguan, and Guangdong more generally, is important because it highlights the deep-seated challenges that are faced by local state actors. Economic restructuring and shifts to more efficient energy generation can contribute to

improvements in air quality. Beyond that, though, even with high-level political commitments to environmental upgrading and a well-developed Protean Environmental State able to act on several fronts, enhancements in environmental quality are hard won. In part, the challenge to improving local environmental quality arises from transboundary effects: air and water pollution are flowing into Dongguan from neighbouring areas. This in turn, suggests challenges to an entrepreneurially informed Protean Environmental State. Environmental challenges that cross borders often require long-term (and expensive) solutions and clash with narrow economic development perspectives. These tensions and contradictions play out on a day-to-day basis as political figures and officials seek to manage the environment in Dongguan. Coalitions are necessarily provisional because as new opportunities and challenges arise so too is the urban and environmental future of Dongguan continually being rethought. From the ‘factory of the world’ Dongguan is to become “an advanced manufacturing centre” part of a larger effort to transform Guangdong into a “Chinese Silicon Valley-style tech corridor” with Dongguan, alongside Guangzhou and Shenzhen, “leading the country in science and technology” (The Guardian 2018). Such a high-tech innovative industrial base will be competing with many other cities and, like them, require a clean, high quality environment if they are to successfully attract and retain firms.

4. Conclusions

Based on our research in Dongguan, a more developed area of China, we have found that a more nuanced approach is necessary to analyses of the local environmental state. In reconceptualising the local state, we have argued that attention needs to be given to local development histories, the interplay between national and local policy agendas, and crucially the more flexible and multi-faceted ways that environmental governance occurs. Regulatory activities provide high profile and visible evidence of efforts to curb the activities of polluting firms. Commitments to a cleaner environment, enable investment in environmental enhancements and increase the potential to attract low carbon and high-tech firm. This can further accelerate the transformation of the local

economy. Our development of the Protean Environmental State marks a significant advance on existing approaches to the local state, at least as they apply to the more economically developed areas of China and to Dongguan in particular. The model of the developmental state promoted by Blecher and Shue (1996 and 2001) and of the entrepreneurial state advocated by Oi (1992) and Walder (1995) still have validity. Both models fit well with explanations of the liberalisation of the Chinese economy and are likely to continue to strike a resonant chord in the Centre and West of the country where the attraction of inward investment to promote economic development remains a priority. However, the models fail to sufficiently account for the emergence of local environmental agendas and practices. Meanwhile, notions of the green state based on ecological modernisation (CCMR 2007; Zhang et al 2007) do not fully appreciate how moves towards greater environmental protection are shaped by development histories and state actions.

The rapid pace of change in policy and state activity is spatially variable. The Protean Environmental State in Dongguan takes its form as a result of the need for policy innovation being framed as one of economic necessity rather than ecological crisis. The local state showed that it was able to absorb new challenges, adapt to new circumstances and present itself as a reformed and multifaceted environmental state. By utilising a more nuanced approach to environmental governance, our depiction of a Protean Environmental State provides valuable insights into how regulatory, recovery, and enhancement activities take place. The Protean Environmental State was formed from a diverse set of factors, including an entrepreneurial leader, a desire to rethink development, and external and internal pressures to improve the quality of the environment. These factors are continually subject to contestation and reinterpretation, which may question (or reinforce) the legitimacy of a local environmental agenda.

Continuing environmental improvements are helpful for the legitimacy of the Protean Environmental State but are not easy to achieve. There are a series of tensions that need to be managed. Support needs to be maintained for environmental improvements that may become more

costly to achieve and whose benefits may be realised over a longer period. All the while, other interests are competing for resources. Resident and migrant populations will benefit from higher standards of air and water quality arising from more stringent enforcement of pollution regulations, environmental improvements, and the replacement of traditional polluting industries by cleaner companies. There will also be new job opportunities in low carbon/high-tech firms. Whether these new jobs will be available to local people and particularly migrant workers is doubtful as they may lack the necessary training and skills. How improvements in environmental quality and employment prospects are perceived in the short and medium term will be important for legitimating the Protean Environmental State.

Another tension arises from the way in which the Protean Environmental State engages with national government. In its drive to improve the environment, national government is keen to ensure that pollution regulation at the local level is strictly enforced. Central government's interest in regulation for environmental quality – where data is relatively easy to measure, monitor (and manipulate) - results in much greater accountability for both local political leaders and officials. There is, though, a contradiction at play here: central government interventions and oversight of local government may provide reassurance to citizens that government is taking pollution seriously, but such actions also undermine the credibility of local regulatory activities. The Protean Environmental State will need to continually reinvent itself to demonstrate its worth. In doing so, its flexibility is helpful: regulation can be tightened or relaxed, or alternative emphases can be presented to the same or different audiences, or the focus of investments can switch between air, water or waste.

References

- Blecher, M. (1991). Development state, entrepreneurial state: the political economy of socialist reform in Xinju municipality and Guanghan county. In *The Chinese state in the era of economic reform* (pp. 265-291). Palgrave Macmillan UK.
- Blecher, M.J. and V. Shue (1996) *Tethered deer: government and economy in a Chinese county*. Stanford University Press.
- Blecher, M. and V. Shue (2001) Into leather: state-led development and the private sector in Xinji. *The China Quarterly* 166, 368-93.
- Buttel, F., 2000. World society, the nation-state, and environmental protection: Comment on Frank, Hironaka, and Schofer. *American Sociological Review*, 65, 117-121.
- CAAC (2017) *China Air Quality Management Assessment Report (2017)*
[file:///C:/Users/Andrew/AppData/Local/Temp/China_Air_Quality_Management_Assessment_Report_\(2017\)-1.pdf](file:///C:/Users/Andrew/AppData/Local/Temp/China_Air_Quality_Management_Assessment_Report_(2017)-1.pdf)
- Caixin (2017) Raw Sewage Stinks Up Guangdong Waterways, April 14
<https://www.caixinglobal.com/2017-04-14/101078605.html>
- Carter N T and Mol A. (Eds.), (2007) *Environmental Governance in China*, Routledge, New York
- Cartier, C. (2015) Territorial Urbanization and the Party-State in China. *Territory, Politics, Governance*, 1-27.
- CCMR (China Centre for Modernisation Research), 2007. *China Modernization Report 2007: Study of Ecological Modernization*, Beijing: Beijing University Press.
- Chinese Government (2014), *Chinese National New-type of Urbanisation Plan (2014-2020)*, Available at Chinese Government Website: http://www.gov.cn/xinwen/2014-03/16/content_2639841.htm [Accessed on March 16th 2014]
- Christoff, P., 1996, 'Ecological modernisation, ecological modernities', *Environmental Politics*, 5(3), pp. 476-500.
- Dongguan Environmental Protection Bureau (2014), The Dongguan riverside industrial data investigation.
- Dongguan Municipal Bureau of Environmental Protection (2018a) available at Dongguan Municipal Bureau of Environmental Protection webpage,
<http://dgepb.dg.gov.cn/publicfiles/business/htmlfiles/dgepb/index.htm?type=5>
- Dongguan Municipal Bureau of Environmental Protection (2018b) Dongguan Environmental Bulletin 2017, available at Dongguan Municipal Bureau of Environmental Protection,
<http://dgepb.dg.gov.cn/publicfiles///business/htmlfiles/dgepb/cmsmedia/document/doc360271.pdf>)
- Guangdong Water Conservancy and Electric power (Survey and Design) Research Institute, 2014, River System Comprehensive Plan for Dongguan Water site Area, Dongguan

Harvey, D., 1989. From managerialism to entrepreneurialism: the transformation in urban governance in late capitalism. *Geografiska Annaler: Series B, Human Geography*, 71(1), pp.3-17.

Horesh, N. and Lim, K.F., 2017. China: an East Asian alternative to neoliberalism?. *The pacific review*, 30(4), pp.425-442.

Huber, J. (1982) *Die verlorene Unschuld der Ökologie. Neue Technologien und superindustrielle Entwicklung*. Frankfurt am Main: Fisher Verlag.

Li, Y.W., Miao, B. and Lang, G., 2011. The local environmental state in China: a study of county-level cities in Suzhou. *The China Quarterly*, 205, pp.115-132.

Li, Y., & Wu, F. (2012). The transformation of regional governance in China: the rescaling of statehood. *Progress in Planning*, 78(2), 55-99.

Lim, K.F., 2016. 'Emptying the cage, changing the birds': state rescaling, path-dependency and the politics of economic restructuring in post-crisis Guangdong. *New Political Economy*, 21(4), pp.414-435.

Lin, G.C. (2009) *Developing China: Land, politics and social conditions*. Routledge.

Liu, J., & Diamond, J. (2005). China's environment in a globalizing world. *Nature*, 435(7046), 1179-1186.

Liu, J., & Yang, W. (2012). Water sustainability for China and beyond. *Science*, 337(6095), 649-650.

Liu, L., Wu, T., Xu, Z. and Pan, X., 2018. The Water-Economy Nexus and Sustainable Transition of the Pearl River Delta, China (1999–2015). *Sustainability*, 10(8), p.2595.

Lu, Y., Song, S., Wang, R., Liu, Z., Meng, J., Sweetman, A. J., ... & Wang, T. (2015). Impacts of soil and water pollution on food safety and health risks in China. *Environment international*, 77, 5-15.

Matus, K., Nam, K. M., Selin, N. E., Lamsal, L. N., Reilly, J. M., & Paltsev, S. (2012). Health damages from air pollution in China. *Global environmental change*, 22(1), 55-66.

Mol, A. 1995. *The Refinement of Production Ecological modernization Theory and The Chemical industry*. Dublin: International Books

Mol, A. (2006) Environment and modernity in transitional China: Frontiers of ecological modernization *Development Change*, 37 (1) (2006), pp. 29–56

NPC, (National People's Congress), 2014a, NPC Begins the Fourth Review on Environmental Protection Law, Available at China National Peoples' Congress:http://www.npc.gov.cn/englishnpc/news/Legislation/2014-04/23/content_1860856.htm [accessed on May 4th 2015]

NPC, (National People's Congress), 2014b, Draft law Up Punishment for Environmental Wrong Doing, Available at China National Peoples' Congress:
http://www.npc.gov.cn/englishnpc/news/Legislation/2014-04/22/content_1860577.htm [accessed on May 4th 2015]
China Oi, J.C. (1992) Fiscal reform and the economic foundations of local state corporatism in China. *World Politics* 45, 99-126.

- Oi, J. (1999) Local state corporatism. *Rural China Takes Off: Institutional Foundations of Economic Reform*, 95-138.
- Phung 2002; Ecological Modernisation of Industrial Estates in Viet Nam, PhD Dissertation, Wageningen, Wageningen University
- Pow, C.P. and Neo, H., 2013. Seeing red over green: Contesting urban sustainabilities in China. *Urban Studies*, 50(11), pp.2256-2274.
- Pow, C.P. and Neo, H., 2015. Modelling green urbanism in China. *Area*, 47(2), pp.132-140.
- Reuters (2018) China's environment watchdog targets waste as pollution battle escalates, May 11 2018
- Rolf, S., 2019. National development through global production networks? The case of Dongguan, China. *Political Geography*, 73, pp.48-59.
- Shen, J., Wei, Y.D. and Yang, Z., 2017. The impact of environmental regulations on the location of pollution-intensive industries in China. *Journal of Cleaner Production*, 148, pp.785-794.
- Tian, H., Gao, J., Hao, J., Lu, L., Zhu, C., & Qiu, P. (2013). Atmospheric pollution problems and control proposals associated with solid waste management in China: a review. *Journal of hazardous materials*, 252, 142-154.
- The Guardian (2018) Dongguan in the spotlight: hi-tech comeback for 'factory of the world'? 16 February 2018 <https://www.theguardian.com/cities/2018/feb/16/dongguan-spotlight-china-factory-world-hi-tech>
- Walder, A.G. (1995) China's transitional economy: interpreting its significance. *The China Quarterly*, 144, 963-79.
- Wang, M.X., Zhao, H.H., Cui, J.X., Fan, D., Lv, B., Wang, G., Li, Z.H. and Zhou, G.J., 2018. Evaluating green development level of nine cities within the Pearl River Delta, China. *Journal of Cleaner Production*, 174, pp.315-323.
- Wang, X. and Zhu, X., 2013, Top Level Design of Administrative System Reform of Dongguan, *Journal of Dongguan University of Technology*, 20(4): 1-4
- Yang, L.E., Chan, F.K.S. and Scheffran, J., 2018. Climate change, water management and stakeholder analysis in the Dongjiang River basin in South China. *International Journal of Water Resources Development*, 34(2), pp.166-191.
- Yin, C. and Jiang, S. 2003, Inward Direct Investment and Urbanisation – A Case Study of Dongguan and Kunshan's Urbanisation, *Journal of Tsinghua University, (Philosophy and Social Sciences)*, 18(6), 71-79+84
- York, R. and Rosa, E. A., 2003. Key challenges to ecological modernization theory institutional efficacy, case study evidence, units of analysis, and the pace of eco-efficiency. *Organization & Environment*, 16(3), pp. 273-288.
- Yu, L. and Zhu, L. 2009, "Chinese Local State Entrepreneurialism: a Case Study of Changchun" , *International Development Planning Review*, 31 (2), 199-220

Yu, L. 2016, Theoretical Exploration of the "Ecological Civilisation" and New Type of Urbanization, *Urban Development Studies*, 23(1): 19-26

Zhao, H., Duan, X., Stewart, B., You, B., & Jiang, X. (2013). Spatial correlations between urbanization and river water pollution in the heavily polluted area of Taihu Lake Basin, China. *Journal of Geographical Sciences*, 23(4), 735-752.

Zhang, F., 2018. The Chinese developmental state: standard accounts and new characteristics. *Journal of International Relations and Development*, 21(3), pp.739-768.

Zhang, L. (2002) Ecologizing Industrialization in Chinese Small Towns, PhD Dissertation (Wageningen: Wageningen University).

Zhang, L., Mol, A. P., & Sonnenfeld, D. A. (2007). The interpretation of ecological modernisation in China. *Environmental politics*, 16(4), 659-668.